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PolyPlay

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Modular - Immersive - Versatile

A Product by

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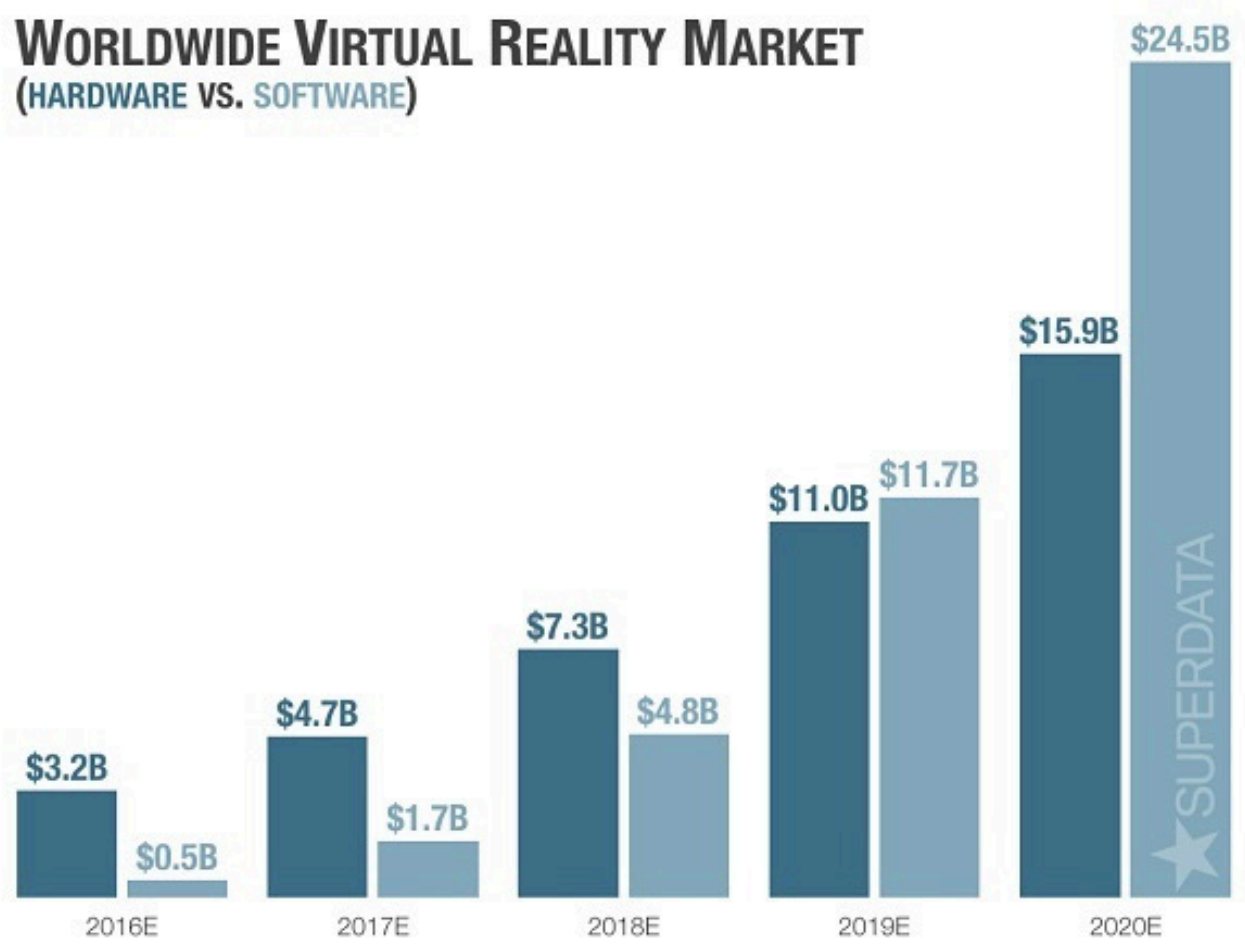
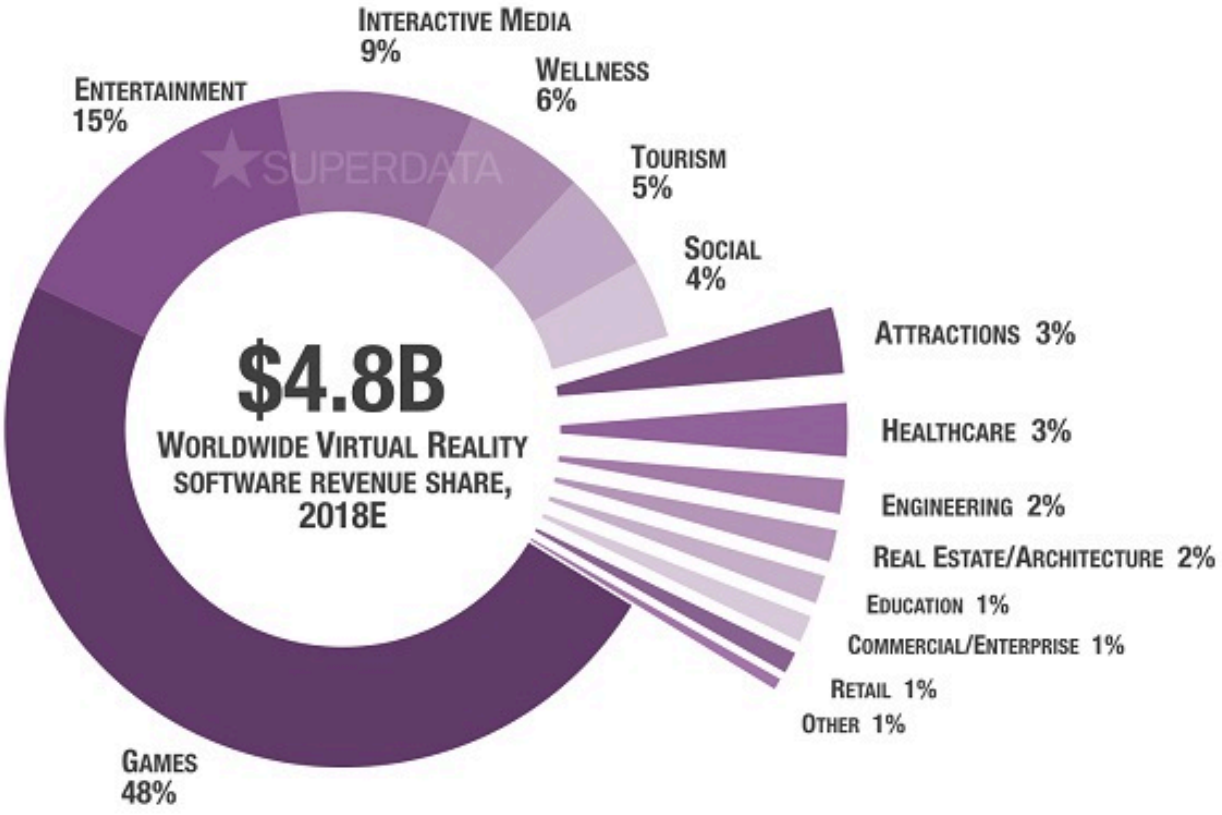
Research

Market Analysis

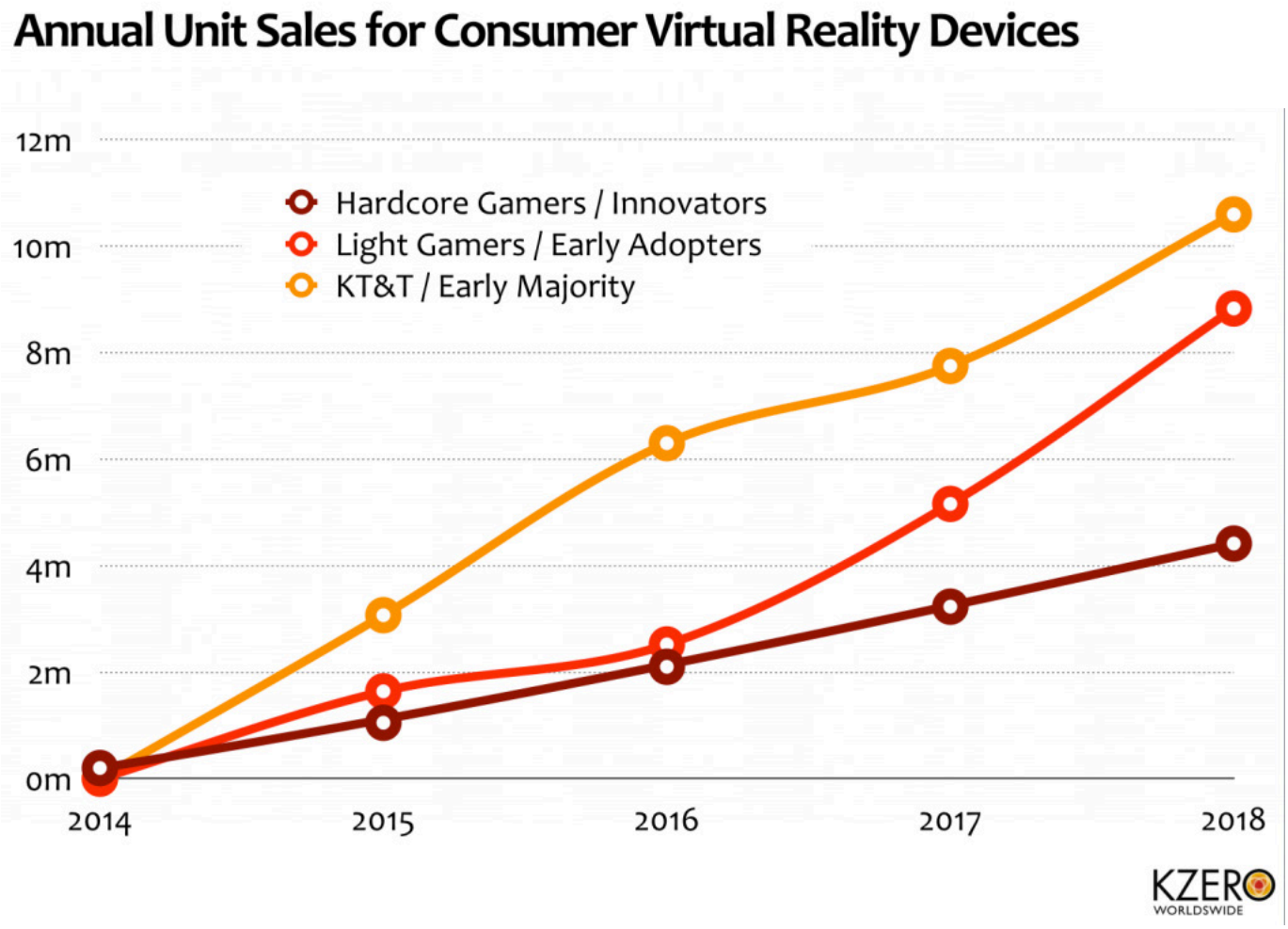
Before the I could start designing, I needed to ensure that there was a market for the product



VR is one of the largest growing markets and is expected to have a $40 billion market by 2020. Currently, the majority of the money is being spent on hardware making the market for a new controller a very viable.



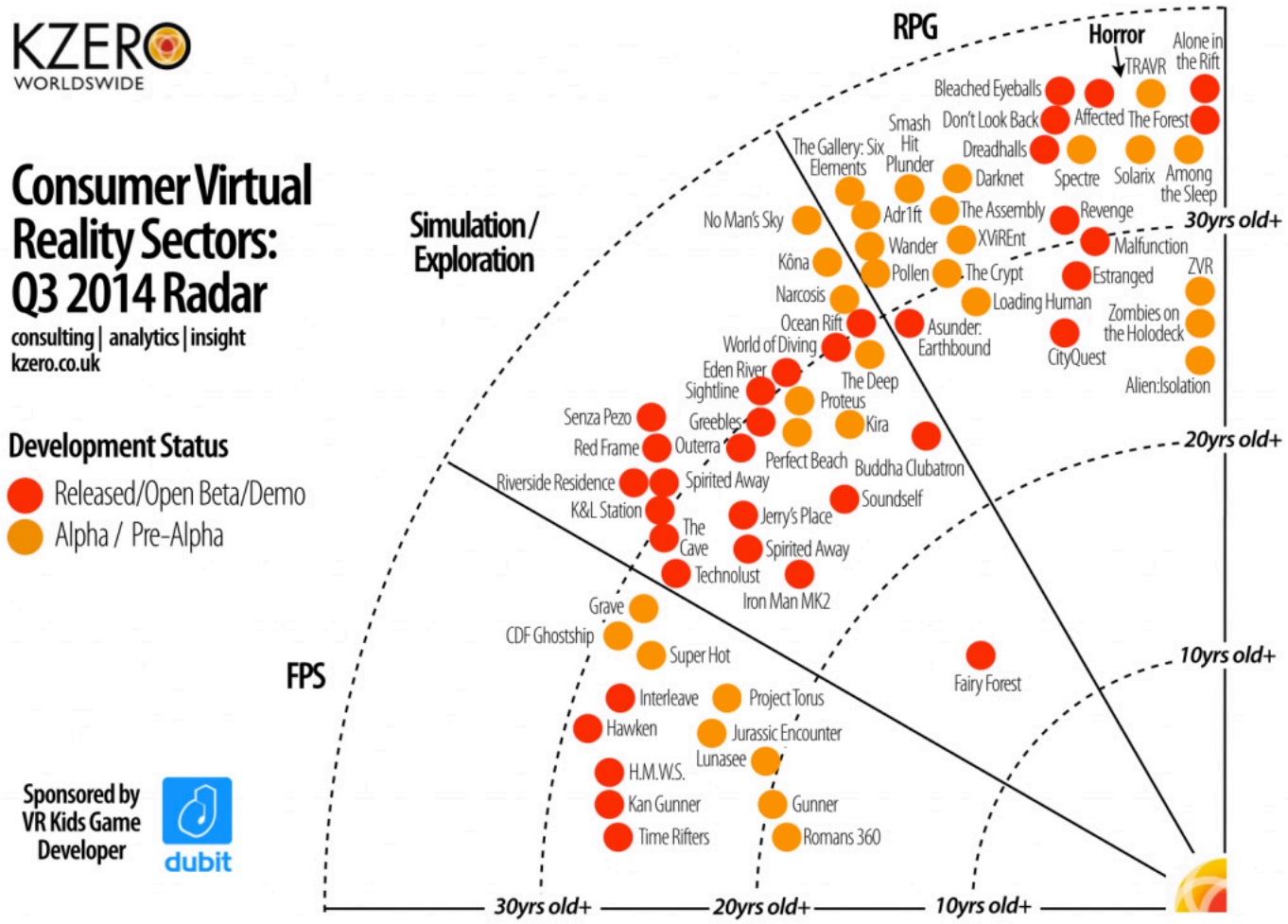
In addition to the growth in the market, nearly half of the market is dominated by the gaming industry. This leaves a huge market for VR games and accessories.



After breaking down the market to VR gaming, I looked specifically at who is speeding the most money within the market. The results showed an increase in the target market, light and hardcore gamers.

Game Analysis

After I found out how big the VR gaming market was, I needed to pinpoint the specific area of the industry that I wanted to enter



A large portion of the games in the market reside within the FPS (first person shooter) and RPG (role playing game) genres. In games like this, the player generally uses weapon such as guns, swords and shields the majority of the time they are playing.

Benchmarking: Headsets

After I learned where the market was thriving, I needed to understand what products were already out in the market

PlayStation VR (PSVR)

The PSVR has taken the lead of global sales by being the cheapest high end VR headset on the market. While affordable, it does lack the ability to have a 360 room-scale VR experience. Due to it's PlayStation origin, the PSVR is receiving a lot of support from game developers.

THC Vive

The Vive is one of the most technically advanced VR headsets on the market. It combines precision 360 room-scale tracking with a partnership with Steam, a game retail program, to create an excellent tool for both developers and gamers.

The HTC Vive Controller & Oculus Touch

The Oculus Rift is similar to the Vive. Although it is slightly less expressive than the Vive, it does have several slight setbacks including spotty 360 room-scale tracking without an add on. However, developers are creating game that are Oculus Rift specific.

Benchmarking: Controllers

Once I understood the possible headsets that are available, I could start looking at the current controllers

The HTC Vive Controller & Oculus Touch

These are the basic two controllers that come with two of the leading VR headsets on the market, the HTC Vive and the Oculus Rift. They have exceptional motion tracing as well as being very versatile and can be used for many applications however they offer very little haptic feedback for gaming.

Xbox One & PS4 Controllers

These two controllers are used for VR with the Oculus Rift or the PSVR. They are excellent controllers for traditional gaming, however they lack motion tracking and significant haptic feedback making them not ideal for VR gaming.

Delta Six and PSVR Aim

At the other end of the spectrum, VR controllers like the Delta Six and PSVR Aim are heavily machined controllers that are built to feel like one in-game held object. While controllers like this do their job well, they become almost completely useless when you switch games or even just change weapons in-game.

Conclusions

After thoroughly exploring the market,
I learned several critical things.

Hardware:

Currently, hardware is the biggest market for VR. In addition, all of the hardware is new and product and markets are constantly being replaced with better ones.

Gaming Market:

The VR gaming market is rapidly expanding its software, but one two of the main focuses are RPG's and FPS's.

Headsets:

There are two headset markets, preference oriented (Vive, and Oculus Rift) and gaming oriented (PSVR).While the gaming headsets are drawing gamers attention now, the performance headsets have the technology that with allow fully immersive gaming once the hardware is developed.

Controllers

Both the classic (Xbox One and PS4) and the basic (Vive Controller and Oculus Touch) do not offer enough haptic feedback for gamers. However, specialty controllers (Delta Six, PSVR Aim) are only useful for a certain type of game making them a difficult sell.

Versatility

It is important for a controller to be versatile so that it can be used for multiple games and not loose functionality.

Testing & Prototyping

Form Exploration

After fulling understanding the market, I had to take what I learned and start creating.

Iterative Design

Throughout the process of designing PloyPlay, the form, functionality and mechanics of the design went through some serious changes. During these iterations I focused on thinks like ergonomics of the hand grips, the ease of use in manipulating the controller into different possitions, and the overall aesthetic of PolyPlay.

Understanding Controller Design

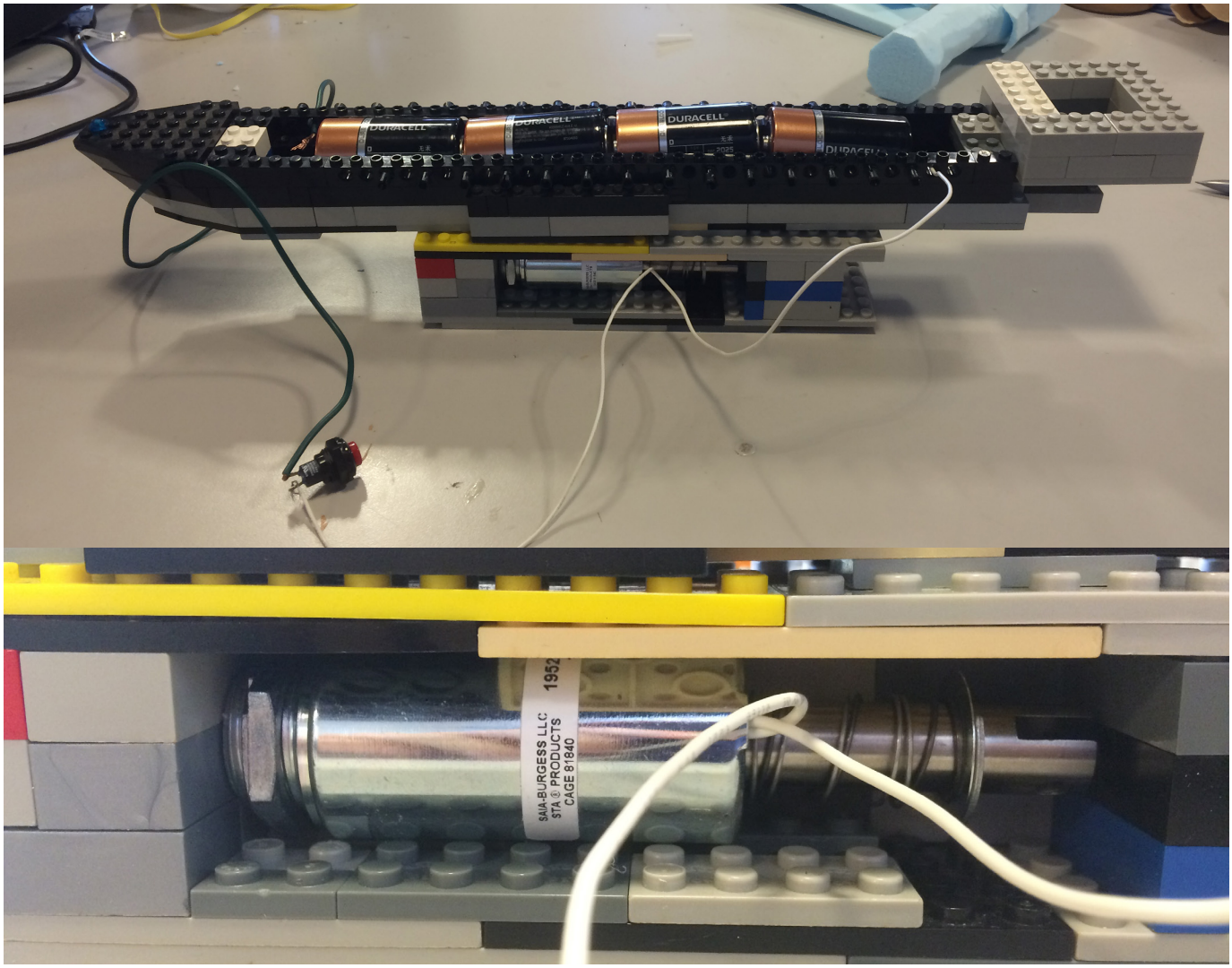
Understanding form and ergonomics wasn't enough, I also needed to understand how to design the internal components of a gaming controller.

Controller Deconstruction

To understand how to design a gaming controller, I looked to the best examples of successful controller design. After gutting nearly 15 different types of controllers, both old and new, I felt that I had an excellent understanding of what made the good controllers have outstanding durability, triggers and button presses.

Understanding the Technology

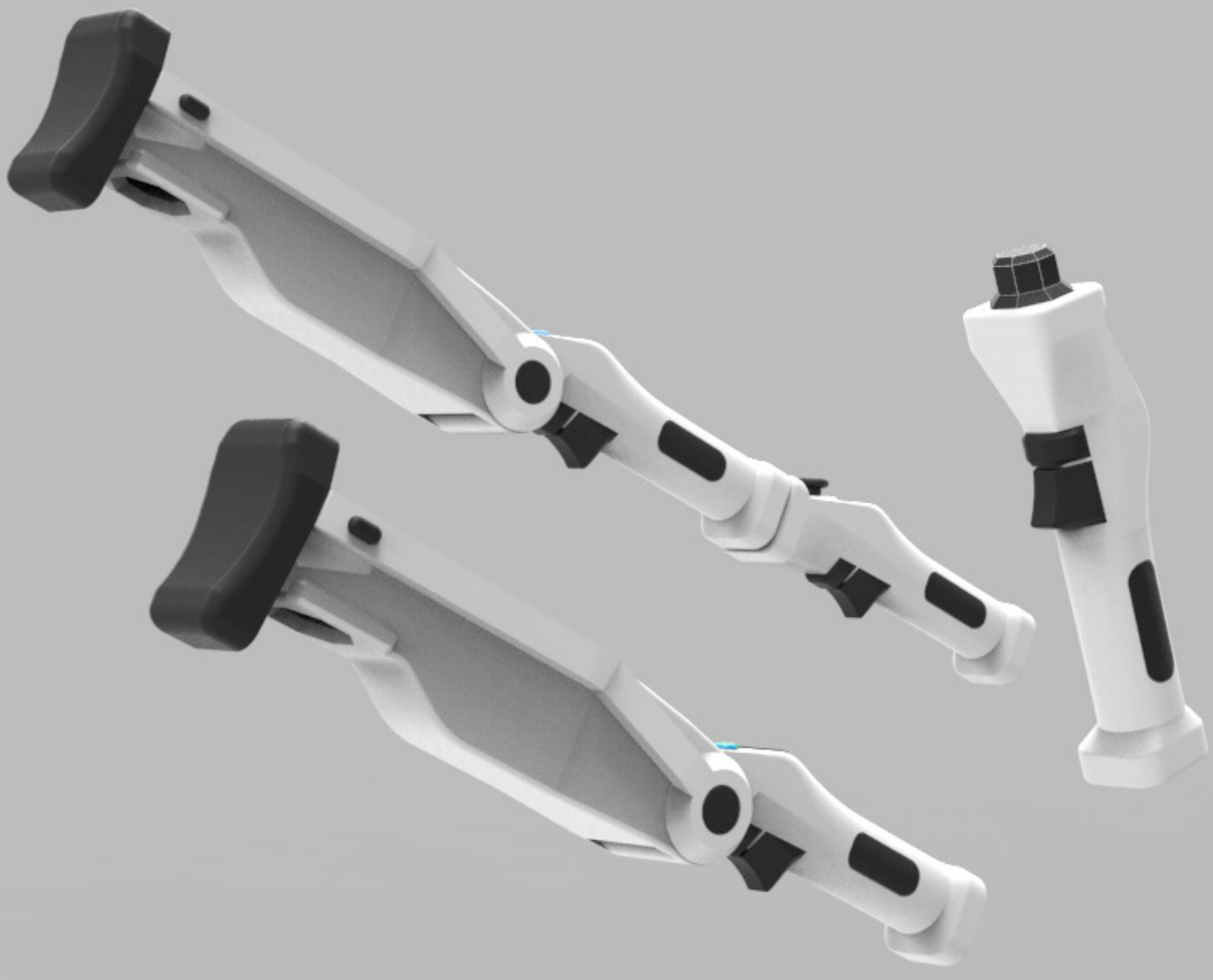
In addition to the controller design, I needed to understand the technology that I was using in PolyPlay.

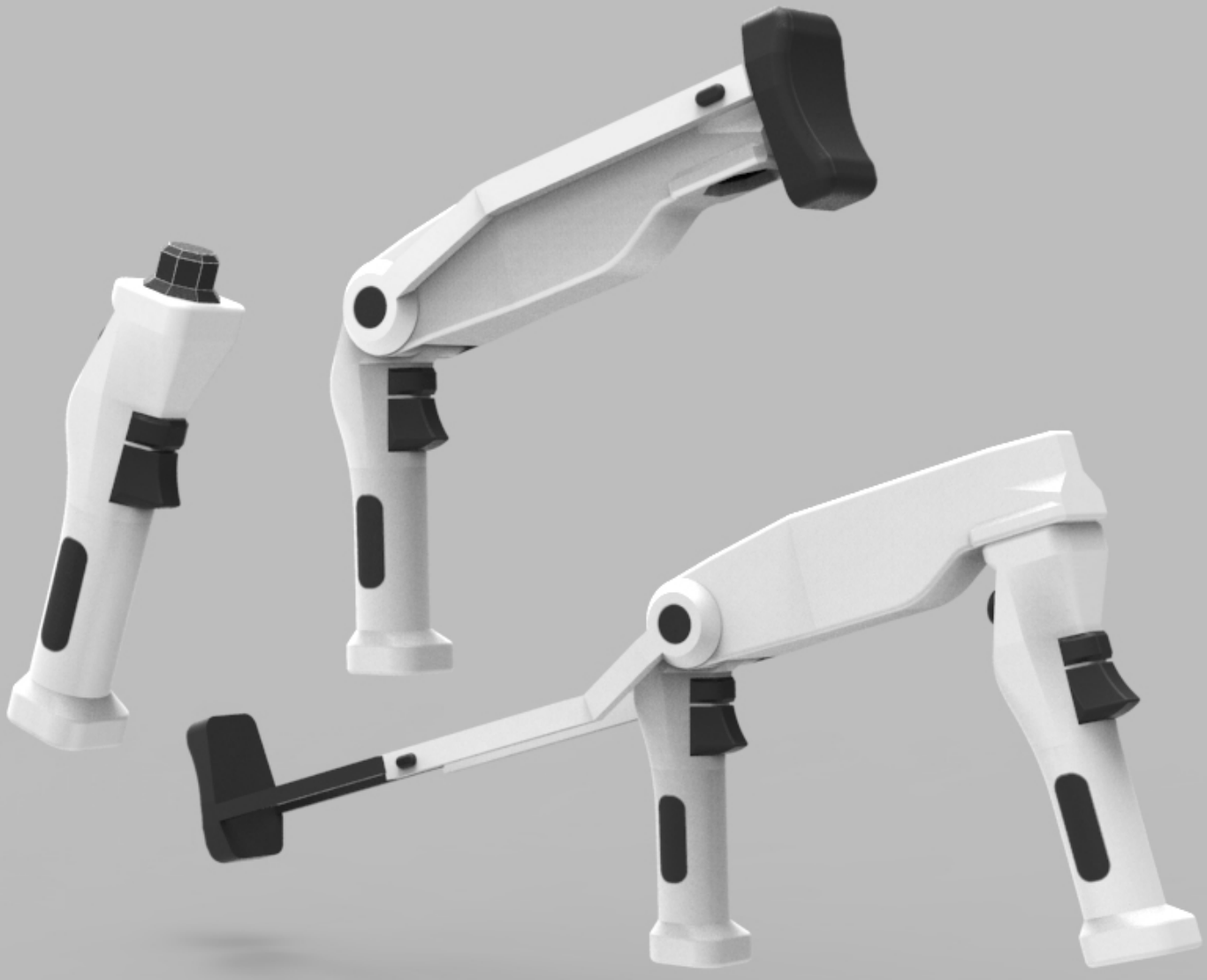


Linear Solenoid Actuator

One of the largest technological hurtles that I had to jump to create PolyPlay was understanding and test the solenoid actuator for the virtual recoil component. I created a model that allowed a variety of different voltage to be used to test what voltage was the most ideal for the success of PolyPlay.

Final Design

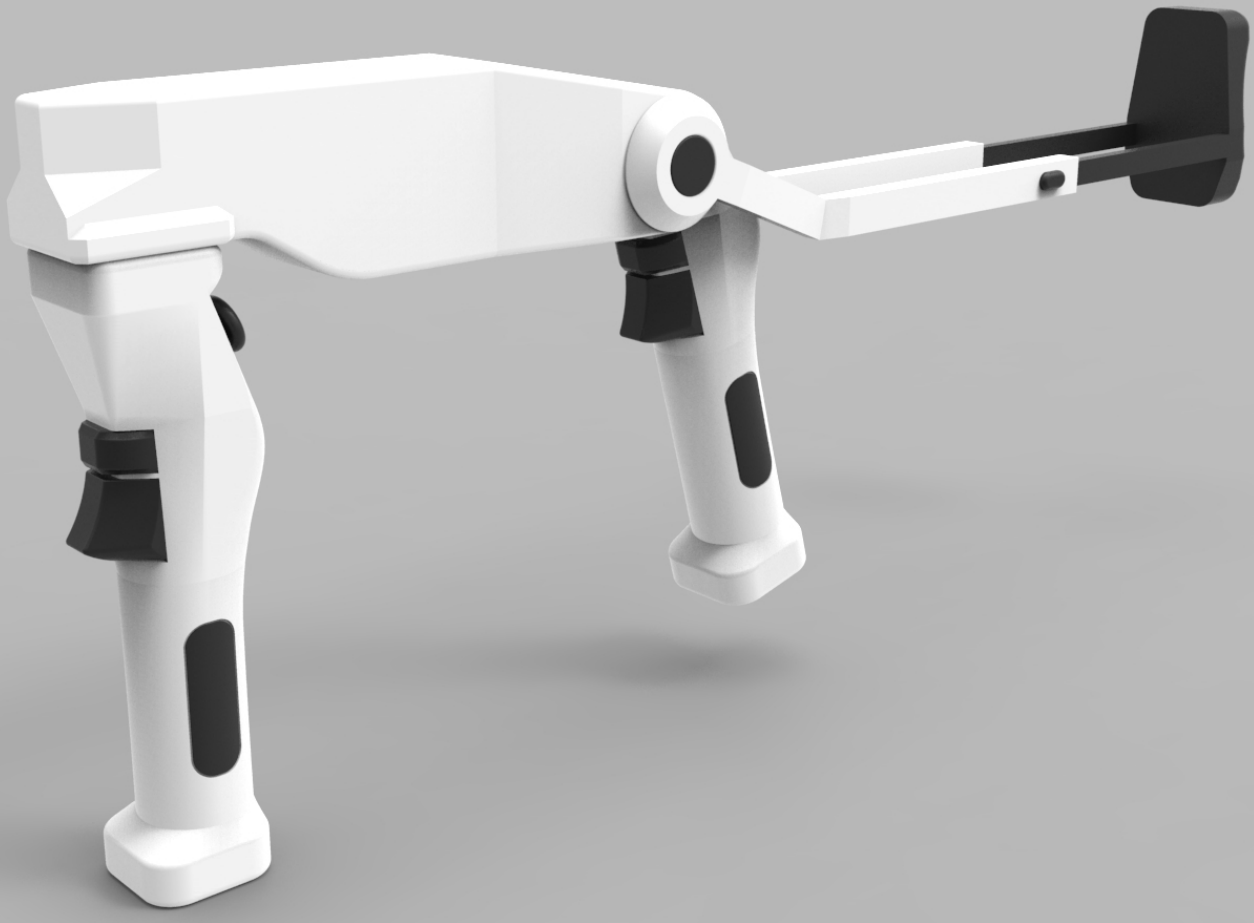




Positions

Assault

Assault and is used for the majority of first person shooter experiences. The gun-like form allows players to have improved aim with the dual grip and stock

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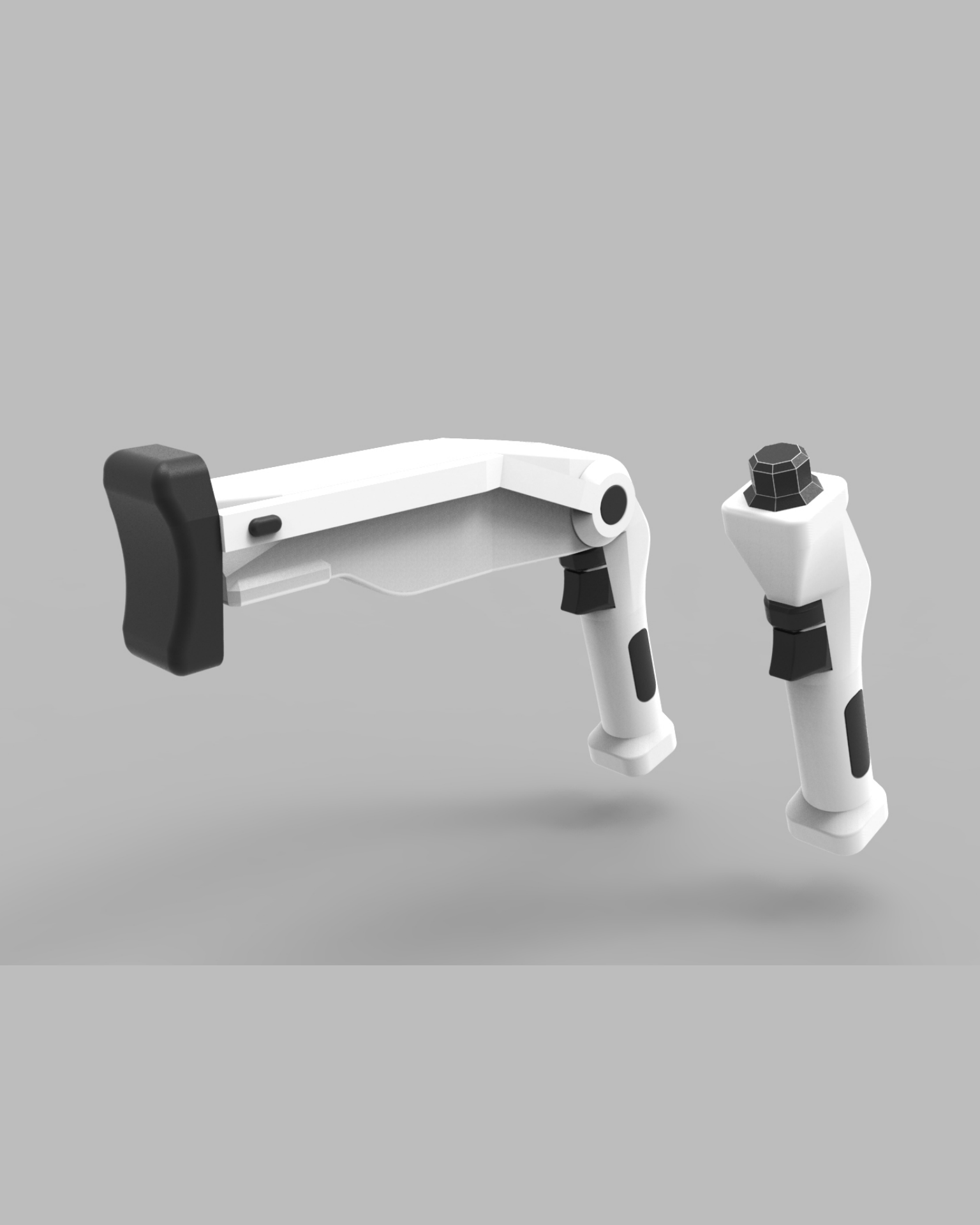
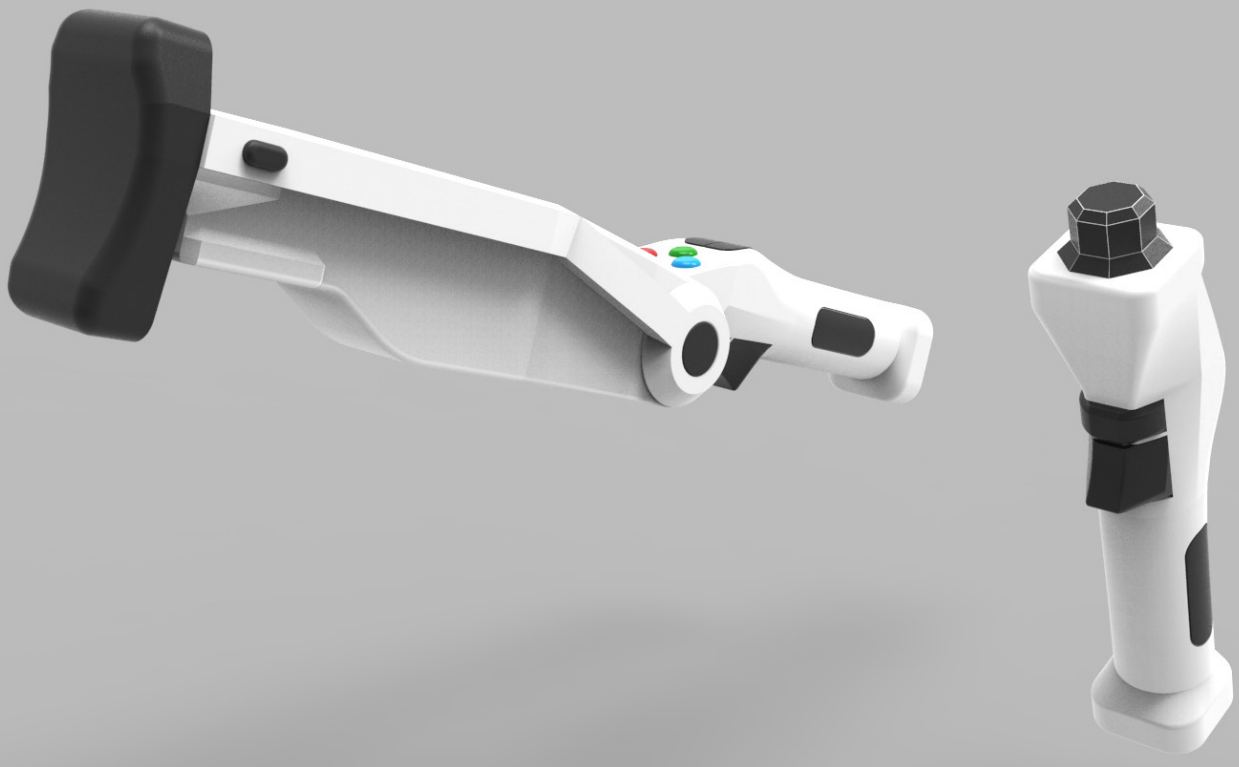
Scout

Scout is meant for simulating small, one handed firearms. Allowing the player to have an extra free hand can lend to creative game play tactics.



Knight

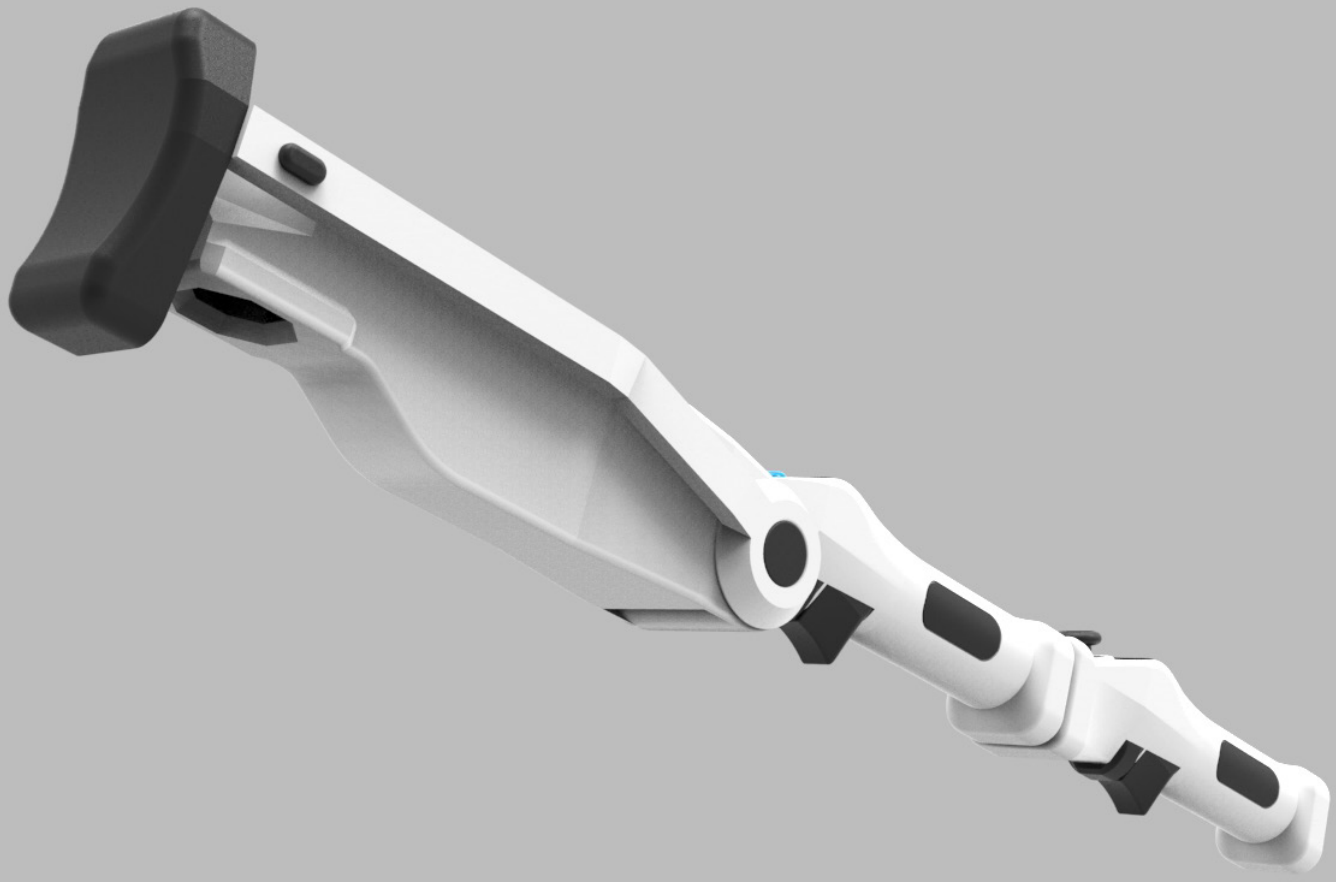
Knight for players who would main a melee weapon. The extra hand can allow players to defend themselves with a shield or go even more offensive with another sword.




VIVE

Warrior

Warrior is made to simulate a heavy two handed weapon. It is for the players who want to swing broad swords and war hammers with all of their might.

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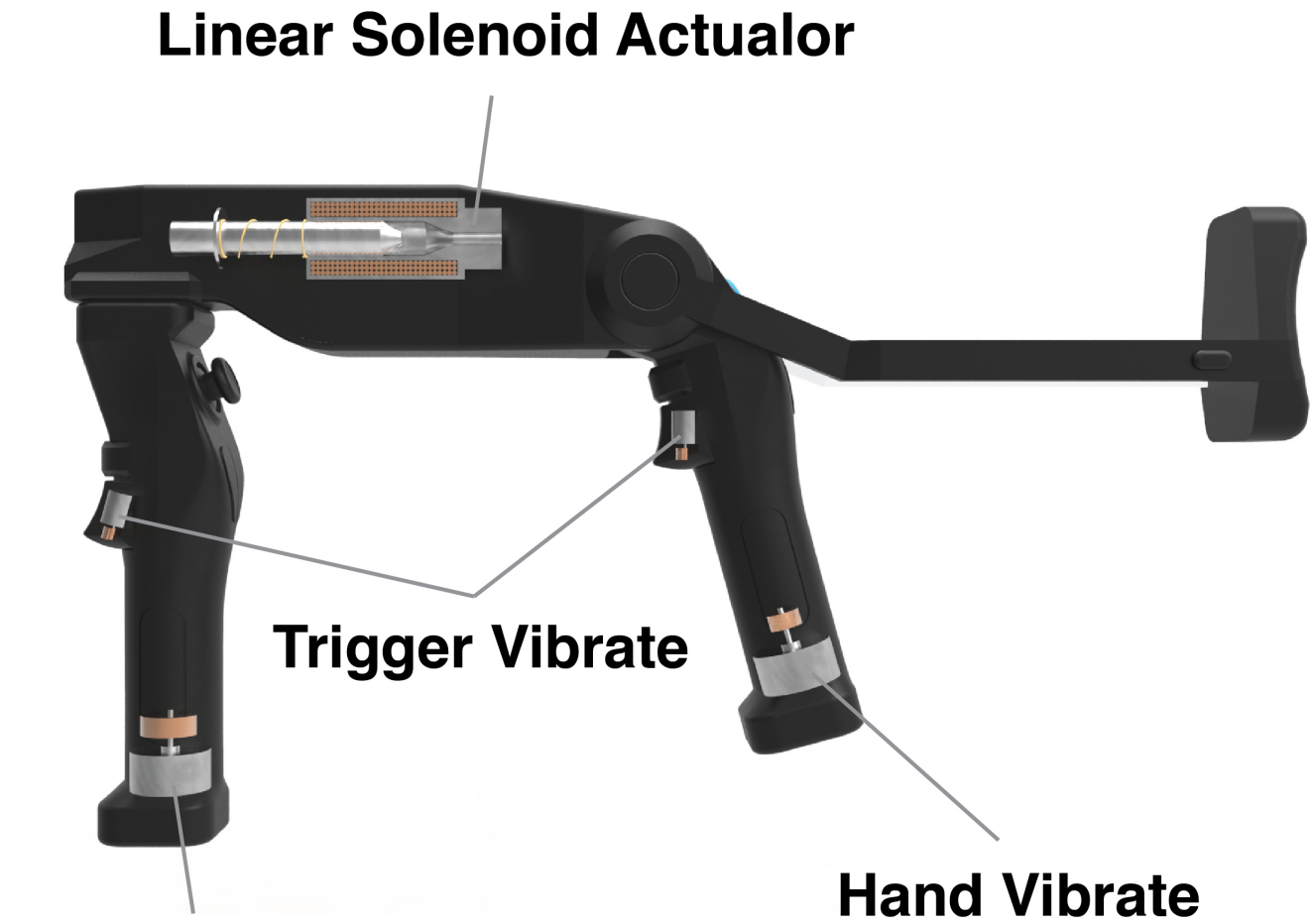
Features

Haptic Feedback

An important part of VR gaming is haptic feedback. Haptic feedback is when the player feels what their character is feeling in-game.

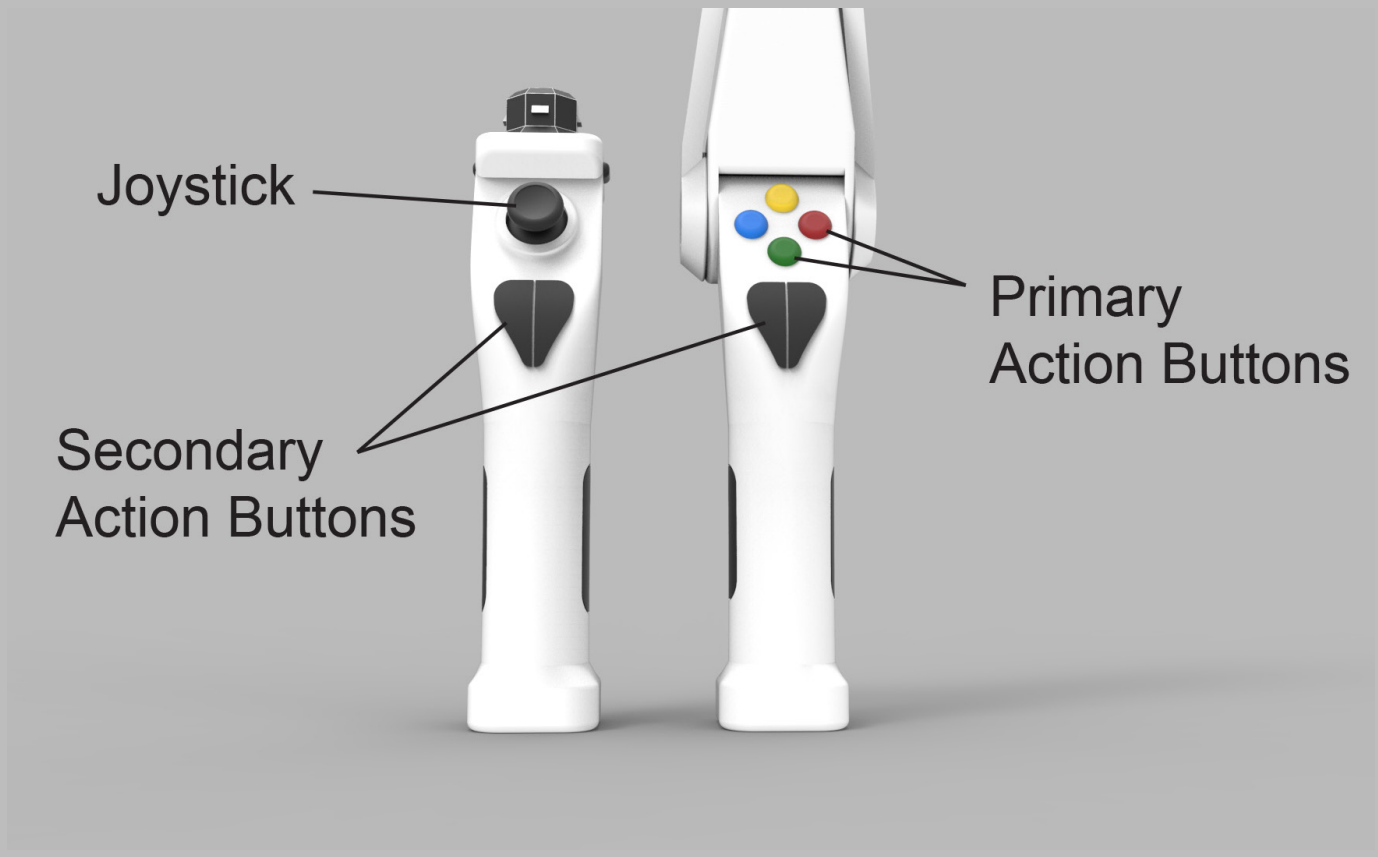


Vibration & Virtual Recoil

In the majority of games that PolyPlay is compatible with, The player will mainly be interacting with firearms, melee weapons and environmental interaction. I chose to add both hand and trigger rumble and vibrations to account for basic environmental interaction situations. The actuator add virtual feedback for virtual recoil for firearms.

Controls

One of the most important parts of a gaming controller is the button, joysticks and triggers that the player will interact with.


Joystick
Primary
Action Buttons
Secondary
Action Buttons

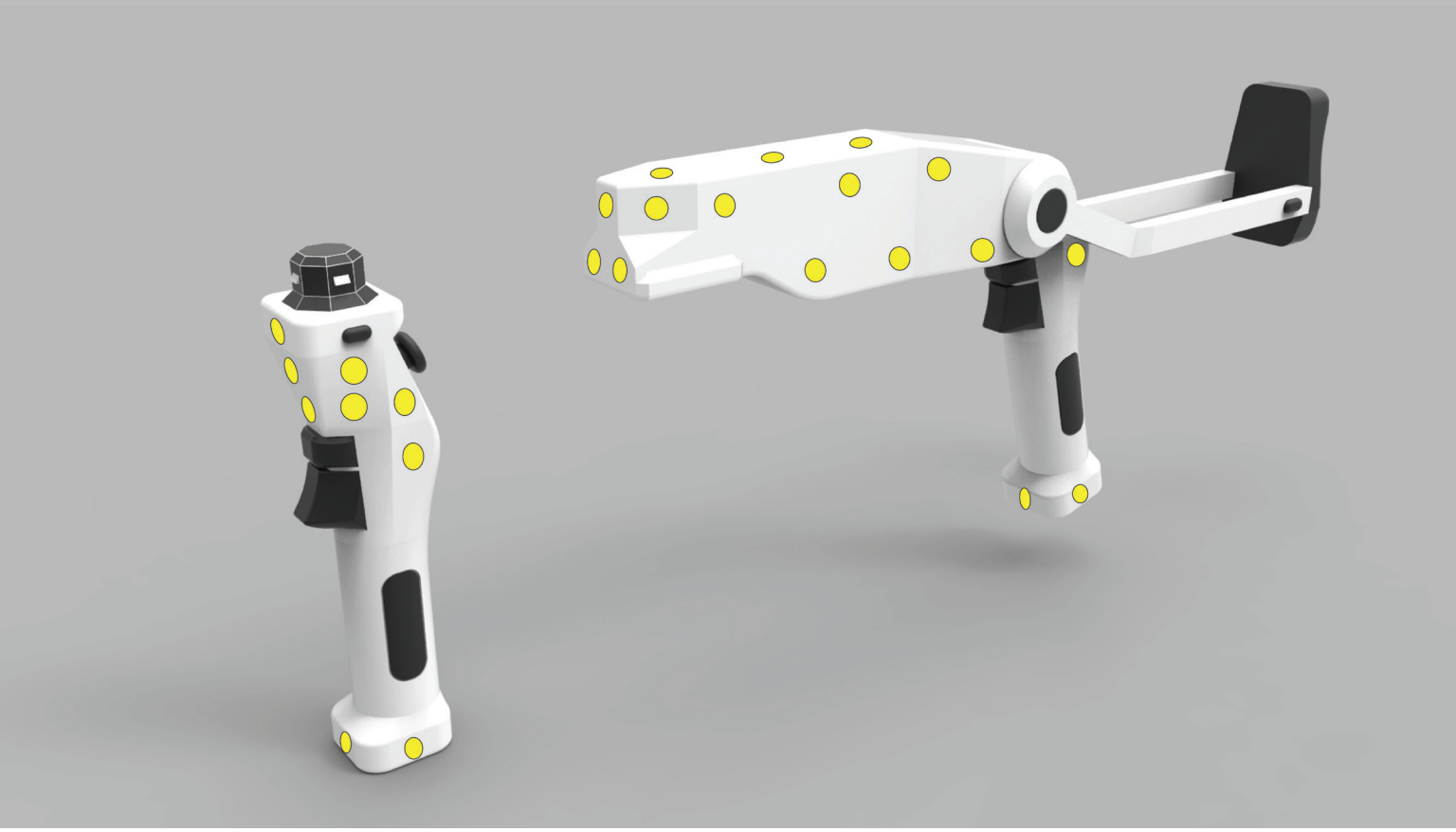

Controller
Release
Bumper
Trigger
Grip
Button

Button Layout

The button layout of PolyPlay was based on two things, traditional gaming controller combined with innovative button design. The triggers, bumpers, joysticks and primary buttons are based on traditional buttons layouts that can be found on crotrollers such as the PS4 and Xbox One controllers. The grip buttons are made to replicate the grip buttons on the Vive and Rift controllers. The secondary action button are innovative new solutions to add additional control input for game developers to sync with new control variations.

Room-Scale Tracking

The Oculus Rift and the HTC Vive both have different methods of player tracking. It is important that the PolyPlay is compatible with both systems.



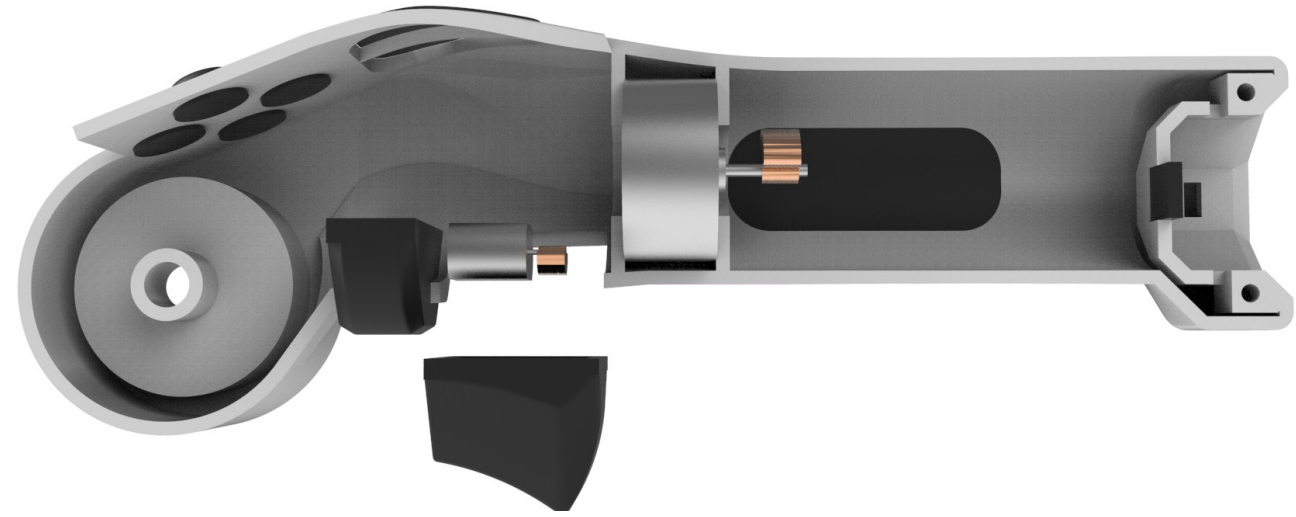
Tracking Technology

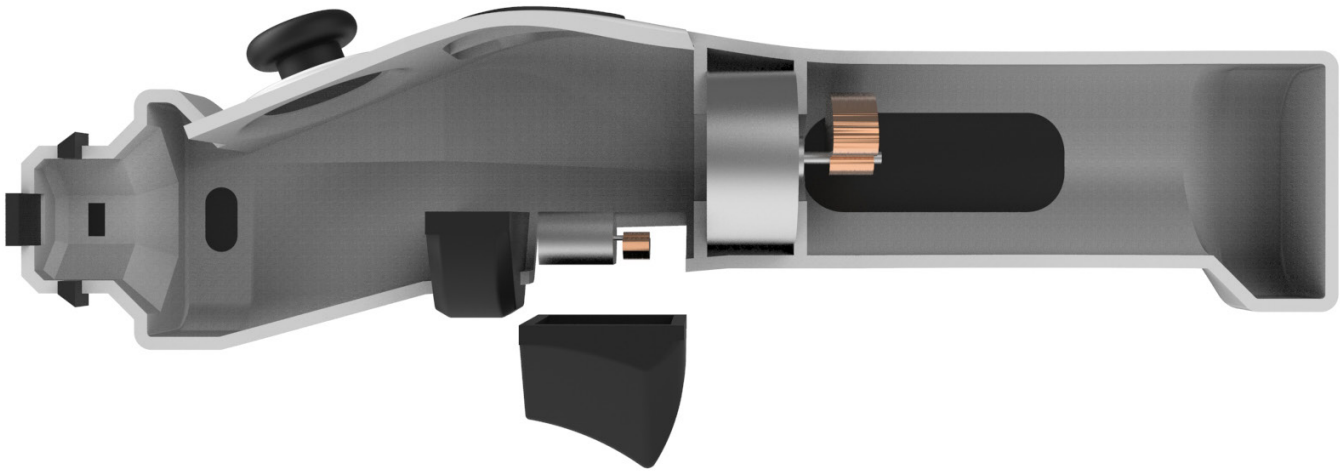
PolyPlay has over 40 compatible receptors for muti-platform playing. It can be manufactured with either LED’s for compatibility with the Oculus Rift or light diodes to work with the Vive’s lighthouse tracking system.

Manufacturing

Methods of Manufacturing

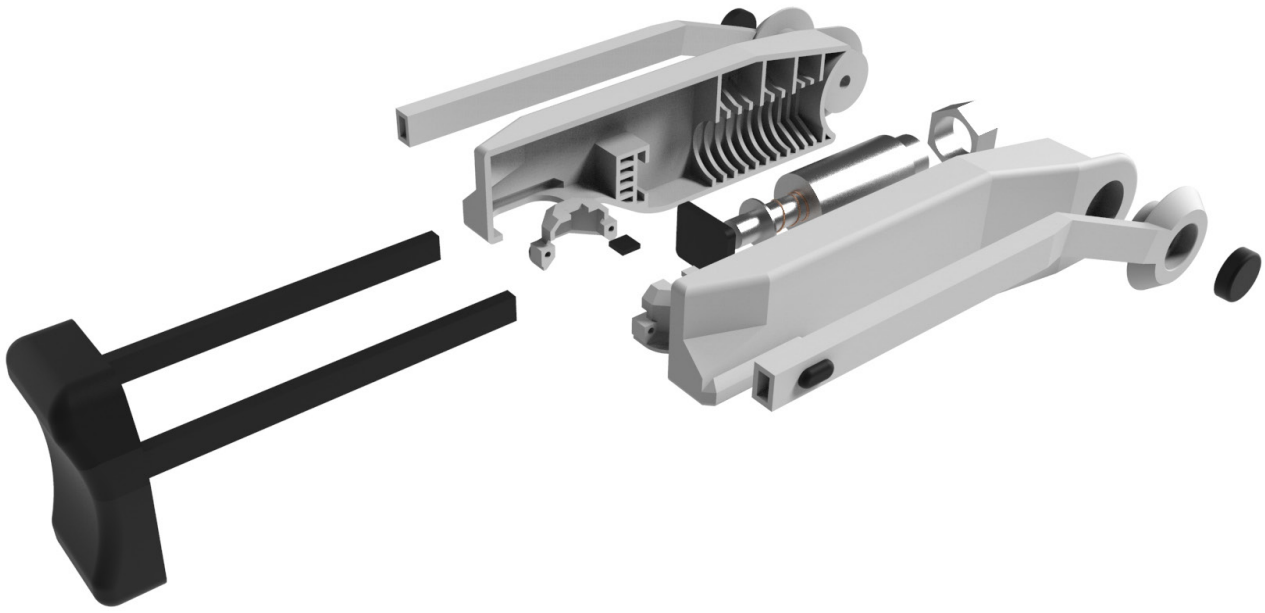
Due the complexity and need for durability of PolyPlay, the manufacturing is intuitively designed.

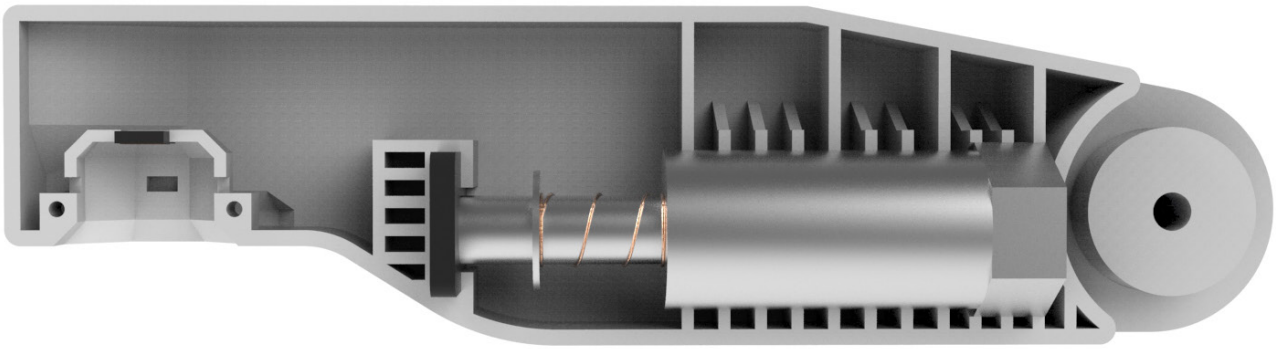




Hand Grips

The hand grips are made out a three part injection mold. The layout of the mold allows for minimal user contact with seam as well as allowing for optimal positioning for button and trigger placement.





Main Body

The body of the controller was designed to house the main components of PolyPlay as well as withstand the force of the Linear Solenoid for the virtual recoil. The area surrounding the actuator is reinforced to withstand the force of it’s recoil.

Thank You For All Who Helped

Special Thanks

Gordon Jackson

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